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Spin-label study of the influence of cold hardening and cartoline on the mitochondrial membranes of winter wheat seedlings

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Abstract

The influence of the conditions of growth (low positive temperatures, cartoline a synthetic anti-stress growth regulator of plants) on the state of the mitochondrial membranes of etiolated winter wheat seedlings has been studied using a spin label (the 1-oxyl-2,2-dimethyloxazolidine derivative of the methyl ester of 5-ketopalmitic acid). At 15-35 °C the correlation times τc of the rotary diffusion of the labels in the mitochondrial membranes were found with values for the cold hardened plants lower than for those grown in normal temperature conditions. It was found that cartoline treatment of the seedlings has virtually no influence on τc in the case of normal growth conditions, but lengthens the times τc, bringing them closer to the values of the optimal variant on cold exposure of the plants. It is concluded that the maintenance of the fluidity of the biomembranes within certain limits and also stabilization of their permeability promote better survival of the winter wheat seedlings on cold exposure. © 1993.